



George C. Marshall Space Flight Center  
Marshall Space Flight Center, Alabama 35812



Materials and Processes  
Laboratory, EM01

Metals Engineering  
Branch, EM30

EM30-WI-008  
02/11/2005

## ORGANIZATIONAL WORK INSTRUCTION

EM30

# PROCESSES DEVELOPMENT CALIBRATION AND VERIFICATION PROCEDURES

<u>RELEASE AUTHORITY</u>	<u>NAME</u>	<u>TITLE</u>	<u>ORG</u>	<u>DATE</u>
Management Representative	_____ Timothy P. Vaughn	Branch Chief	EM30	02/11/2005

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Marshall Space Flight Center Organizational Work Instruction EM30		
Processes Development Calibration and Verification Procedures	Document: EM30-WI-008	Revision: Baseline
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## DOCUMENT HISTORY LOG

Revision	Date	Originator	Description
Baseline	2-11-2005	C. Russell	Document rebaselined due to reorganization of Departments and Laboratories at the Center.

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## 1 SCOPE

- 1.1 SCOPE: This procedure describes the methodology for calibration and verification of welding and thermal spray equipment in the Materials and Processed Laboratory, Metals Engineering Branch, Processes Development Team within the scope defined by MPD 1280.1.
- 1.2 PURPOSE: To outline the procedures for calibration and verification of welding and thermal spray equipment used by the Metals Engineering Branch, Processes Development Team.
- 1.3 APPLICABILITY: This organizational work instruction applies to the Materials and Processes Laboratory, Metals Engineering Branch, Processes Development Team and Support Contractors using welding and thermal spray equipment purchased with government funding.

## 2 APPLICABLE DOCUMENTS

- 2.1 MPD 1280.1 Marshall Management Manual.
- 2.2 MPR 8730.5 Control of Inspection, Measuring, and Test Equipment.
- 2.3 EM30-WI-002 EM30 Work Tracking, Product Traceability and Control, and Data Control.
- 2.4 3913-WS-002 Calibration Procedure for Vertical , Circumferential, Horizontal and High Speed Friction Stir Weld Systems
- 2.5 3913-WS-001 Calibration Procedure for Hobart HAWCS II Variable Polarity Plasma Arc Welding Equipment
- 2.6 CP-H-01 Calibration Procedure for Taper Weld Programmer Variable Polarity Plasma Arc Welding Equipment
- 2.7 CP-VPS-06 Calibration Procedure for Vacuum Plasma Spray System
- 2.8 CP-SM-03 Calibration Procedure for Shrinkage Measurement Tool
- 2.9 CP-PM-04 Calibration Procedure for Peaking & Mismatch Measurement Tool

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### 3 DEFINITIONS

- 3.1 Definitions in MPR 8730.5 apply.
- 3.2 Accuracy – the degree of conformity of a measure to a standard or a true value.

### 4 INSTRUCTIONS

- 4.1 GENERAL: All machining, welding, thermal spray and post weld inspection equipment shall be classified as category III, IV, or V per the requirements of MPR 8730.5.
  - 4.1.1 Test and measuring instruments used in the equipment calibration shall be classified as Category I or II per MPR 8730.5 and shall have an accuracy greater than the tolerances of the parameters being calibrated.
  - 4.1.2 Only designated personnel shall perform the equipment calibration.
  - 4.1.3 Current calibration status shall be posted with the equipment and shall be visible from the outside of the equipment.
- 4.2 CALIBRATION VERIFICATION: Verification of machining, welding, thermal spray, and post weld inspection equipment calibration is required if one or more of the following circumstances is satisfied:
  - 4.2.1 The calibration due date is nearing or has past. If the due date has past then calibration is needed prior to using the equipment in question.
  - 4.2.2 The user suspects the equipment of being out of calibration.
  - 4.2.3 A repair has been performed on the equipment that alters the calibration.
  - 4.2.4 New equipment has been installed and calibrated by the manufacturer or qualified outside calibration vendor.
- 4.3 CATEGORY IV CALIBRATION VERIFICATION PROCEDURES:
  - 4.3.1 Organizational personnel shall perform a verification of the equipment calibration prior to use or every six months for Category IV equipment.
  - 4.3.2 The calibration verification shall be recorded in the log book affixed to the equipment and document the date, the NEMS numbers of system components (if applicable), who performed calibration, and the NEMS number of the test equipment used to perform the calibration verification and the specific parameters required for pre-calibration data measured prior to performing the calibration verification.

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4.3.3 If the equipment cannot be successfully calibrated and verified then it must be repaired or discarded in accordance with MPG 8730.5.

4.4 CALIBRATION/VERIFICATION RECORD ARCHIVING: All calibration and verification records shall be stored in accordance with standard organizational practices found in EM30-WI-002.

## 5 NOTES

5.1 None.

## 6 SAFETY PRECAUTIONS AND WARNING NOTES

6.1 Standard high voltage and electrical safety precautions apply. Reference equipment operation manual.

## 7 APPENDICES, DATA, REPORTS, AND FORMS

7.1 Not Applicable

## 8 QUALITY RECORDS

8.1 The following listing includes EM30 Quality Records that are collected and saved during process development calibration and verification.

8.1.1 Weld Station 1 log book

8.1.2 Weld Station 2 log book

8.1.3 Circumferential Weld Tool log book

8.1.4 Vertical Weld Tool log book

8.1.5 Vacuum Plasma Spray System log book

8.1.6 Weld Station 3 log book

8.1.7 Weld Station 5 Horizontal Weld Tool log book

8.1.8 Weld Station 6 High Speed Weld Tool log book

8.1.9 Peaking and Mismatch Measurement Tool log book

8.1.10 Shrinkage Measurement Tool log book

8.2 All schedules pertaining to EM30 Quality Record retention and disposition are compiled in the EM30 Quality Records Listing located on the master list of the EM30 group website <http://maptis.nasa.gov/em30/em30masterlist.html>

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## 9 TOOLS, EQUIPMENT, AND MATERIALS

9.1 Not Applicable

## 10 PERSONNEL TRAINING AND CERTIFICATION

- 10.1 Any support contractor personnel or MSFC personnel calibrating or maintaining welding and thermal spray equipment as of October 1, 1997 are officially qualified to calibrate equipment.
- 10.2 Any support contractor personnel or MSFC personnel calibrating or maintaining new equipment are required to be trained and approved by qualified personnel or the manufacturers training representative prior to independent calibration of the equipment.
- 10.3 Any new support contractor personnel or MSFC personnel calibrating or maintaining welding and thermal spray equipment are required to be trained and approved by qualified personnel or the manufacturers training representative prior to independent calibration of the equipment.

## 11 FLOW DIAGRAM

11.1 Flow diagrams for level I and II calibration are found in MPR 8730.5.

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